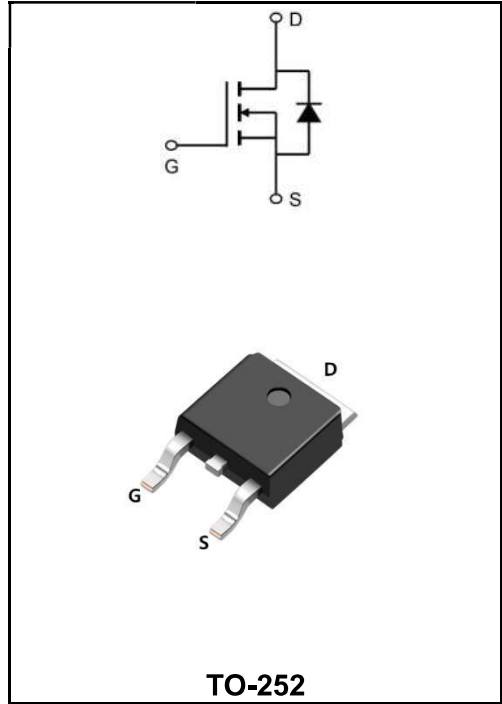


50V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

| | |
|--|------------------------|
| I_D | 50A |
| V_{DSS} | 50V |
| R_{DS(on)-typ(@V_{GS}=10V)} | < 19mΩ (Type: 15.5 mΩ) |



Application

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

Product Specification Classification

| Part Number | Package | Marking | Pack |
|-------------|---------|-------------------|--------------|
| YFW50N05AD | TO-252 | YFW 50N05AD XXXXX | 2500PCS/Tape |

Maximum Ratings at T_c=25°C unless otherwise specified

| Characteristics | Symbols | Value | Units |
|---|------------------|-------------|-------|
| Drain-Source Voltage | V _{DS} | 50 | V |
| Gate - Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current, V _{GS} @ 10V ¹ @T _C =25°C | I _D | 50 | A |
| Continuous Drain Current, V _{GS} @ 10V ¹ @T _C =100°C | I _D | 23 | A |
| Pulsed Drain Current ² | I _{DM} | 85 | A |
| Single Pulse Avalanche Energy ³ | E _{AS} | 31.3 | mJ |
| Avalanche Current | I _{AS} | 25 | A |
| Total Power Dissipation ⁴ @T _C =25°C | P _D | 31.3 | W |
| Total Power Dissipation ⁴ @T _A =25°C | P _D | 2 | W |
| Storage Temperature Range | T _{STG} | -55 to +150 | °C |
| Operating Junction Temperature Range | T _J | -55 to +150 | °C |
| Thermal Resistance Junction-ambient (Steady State) ¹ | R _{θJA} | 65 | °C/W |
| Thermal Resistance Junction-Case ¹ | R _{θJC} | 3 | °C/W |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Test Condition | Symbols | Min | Typ | Max | Units |
|--|--|------------------------------|-----|-------|------|-------|
| Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | BV_{DSS} | 49 | 55 | 58 | V |
| BVDSS Temperature Coefficient | Reference to 25°C , $I_D=1mA$ | $\Delta BV_{DSS}/\Delta T_J$ | - | 0.032 | - | V/°C |
| Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=15A$ | $R_{DS(ON)}$ | - | 15.5 | 19 | mΩ |
| | $V_{GS}=4.5V, I_D=10A$ | | - | 18.5 | 24 | |
| Gate -Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | $V_{GS(th)}$ | 1.2 | 1.4 | 2.5 | V |
| VGS(th) Temperature Coefficient | | $\Delta V_{GS(th)}$ | - | -4.8 | - | mV/°C |
| Drain -Source Leakage Current | $V_{DS}=32V, V_{GS}=0V, T_J=25^\circ C$ | I_{DSS} | - | - | 1 | μA |
| | $V_{DS}=32V, V_{GS}=0V, T_J=55^\circ C$ | | - | - | 5 | |
| Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | I_{GSS} | - | - | ±100 | nA |
| Forward Transconductance | $V_{DS}=5V, I_D=15A$ | g_{FS} | - | 34 | - | S |
| Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1MHz$ | R_g | - | 2.1 | - | Ω |
| Total Gate Charge(4.5V) | $V_{DS}=32V$ $V_{GS}=4.5V$ $I_D=15A$ | Q_g | - | 10 | - | nC |
| Gate-Source Charge | | Q_{gs} | - | 2.55 | - | |
| Gate-Drain Charge | | Q_{gd} | - | 4.8 | - | |
| Turn-on delay time | $V_{DD}=20V$ $V_{GS}=10V$ $R_G=3.3$ $I_D=15A$ | $t_{d(on)}$ | - | 2.8 | - | ns |
| Rise Time | | T_r | - | 12.8 | - | |
| Turn-Off Delay Time | | $t_{d(OFF)}$ | - | 21.2 | - | |
| Fall Time | | t_f | - | 6.4 | - | |
| Input Capacitance | $V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$ | C_{iss} | - | 1013 | - | pF |
| Output Capacitance | | C_{oss} | - | 107 | - | |
| Reverse Transfer Capacitance | | C_{rss} | - | 76 | - | |
| Continuous Source Current ^{1,5} | $V_G=V_D=0V, \text{Force Current}$ | I_S | - | - | 40 | A |
| Pulsed Source Current ^{2,5} | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$ | I_{SM} | - | - | 85 | A |
| Diode Forward Voltage ² | | V_{SD} | - | - | 1.2 | V |
| Reverse Recovery Time | $I_F=15A, di/dt=100A/\mu s, T_J=25^\circ C$ | t_{rr} | - | 10 | - | ns |
| Reverse Recovery Charge | | Q_{rr} | - | 3.1 | - | nC |

Note :

- 1 .The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\cong 300\mu s$, duty cycle $\cong 2\%$
- 3 .The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=25A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

Typical Characteristics

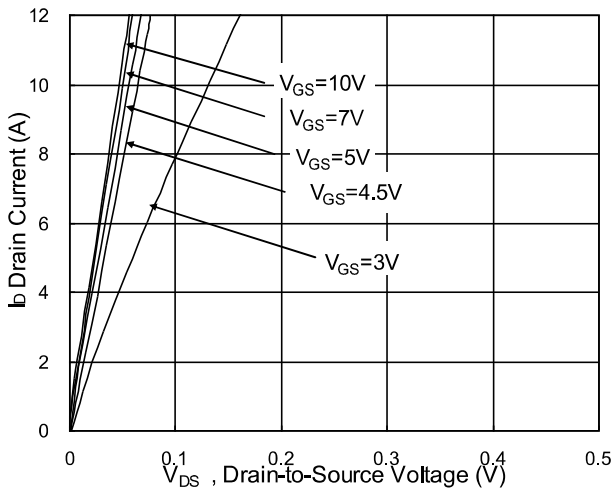


Fig.1 Typical Output Characteristics

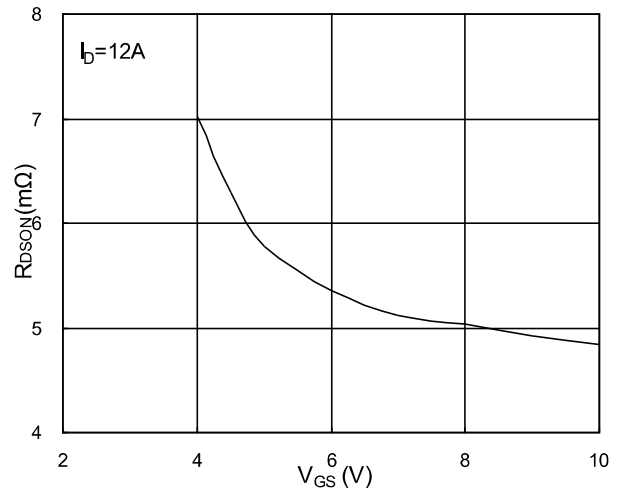


Fig.2 On-Resistance vs. G-S Voltage

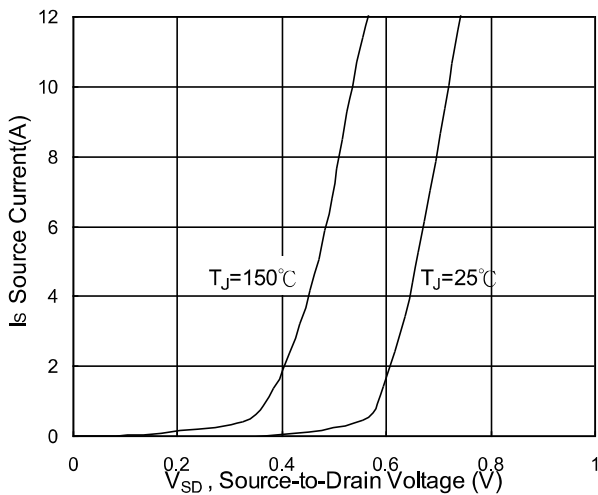


Fig.3 Forward Characteristics Of Reverse

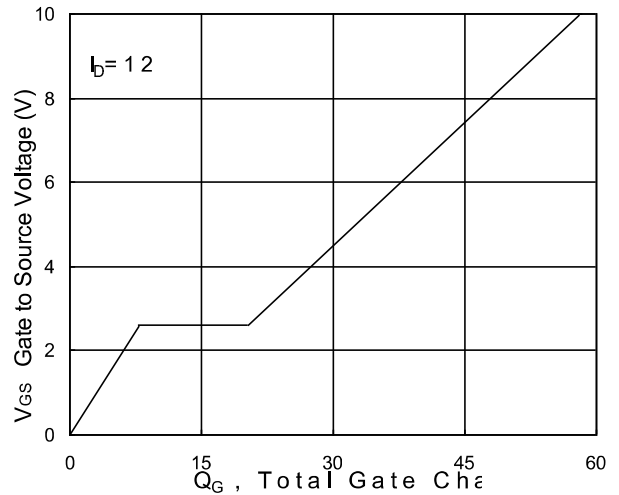
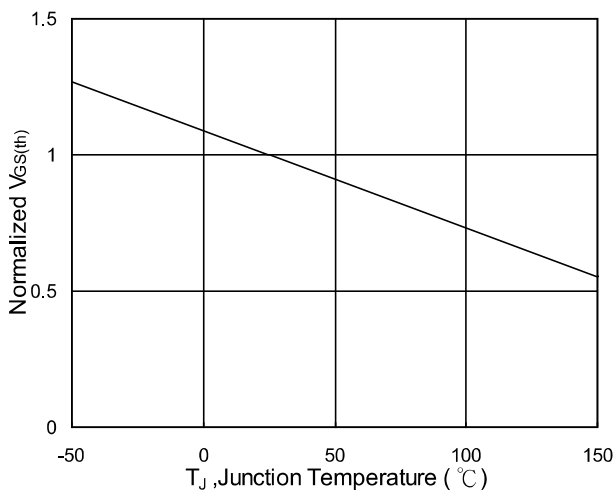
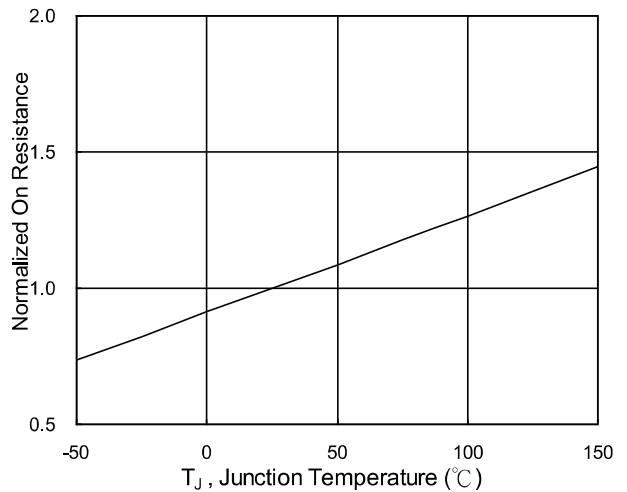


Fig.4 Gate-Charge Characteristics



5 Normalized $V_{GS(th)}$ vs. T



6 Normalized R vs. T

Ratings and Characteristic Curves

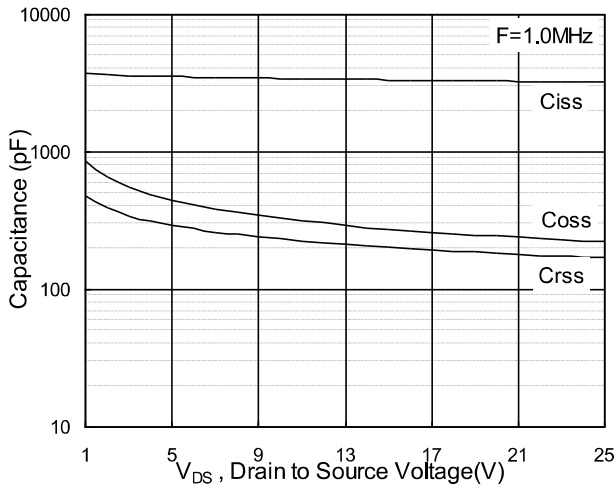


Fig.7 Capacitance

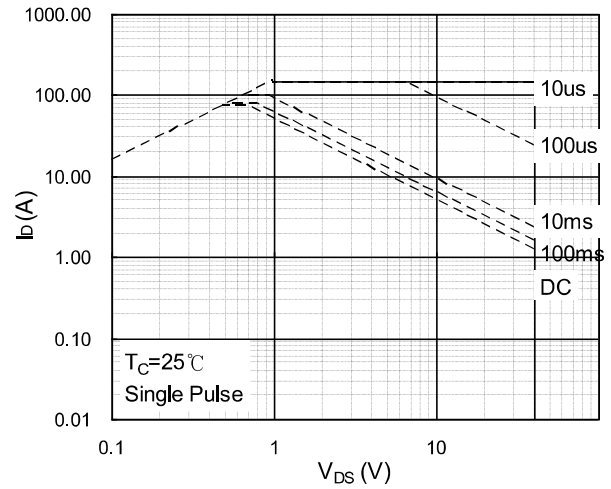


Fig.8 Safe Operating Area

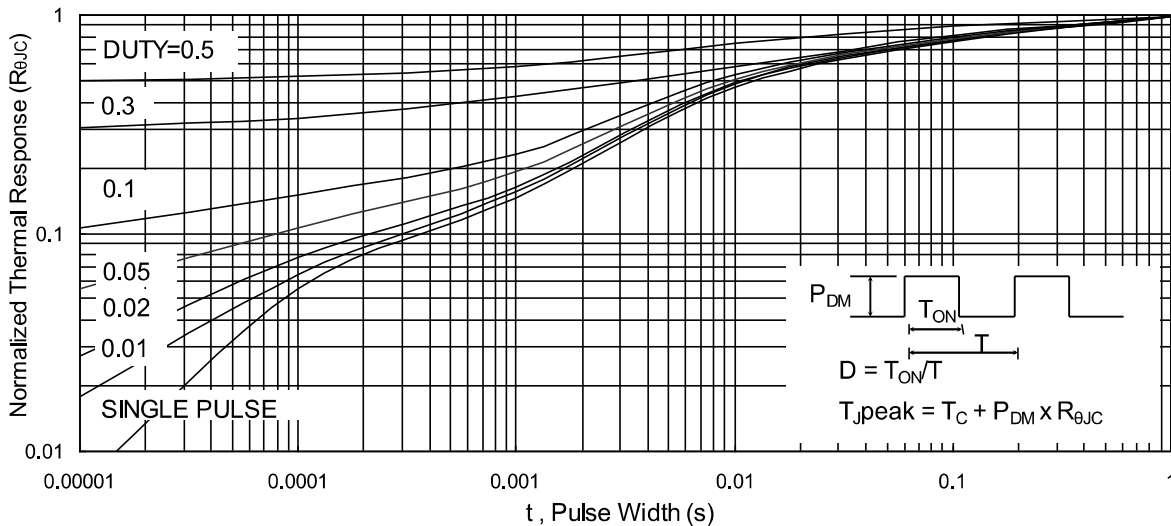


Fig.9 Normalized Maximum Transient Thermal Impedance

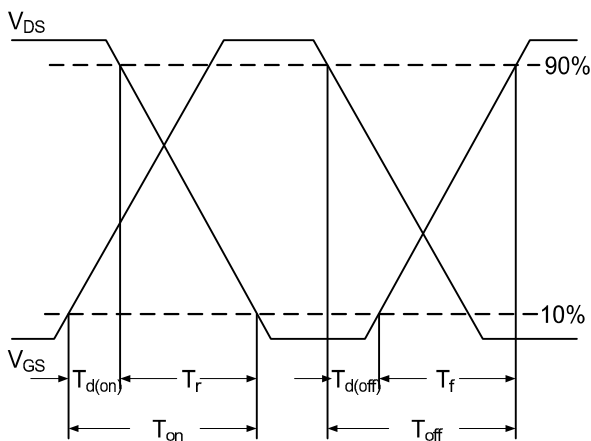


Fig.10 Switching Time Waveform

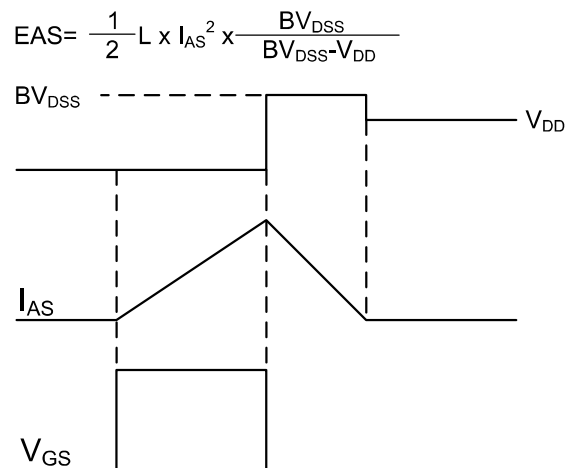


Fig.11 Unclamped Inductive Switching Wave

Package Outline Dimensions Millimeters

TO-252

| Dim. | Min. | Typ. | Max. |
|------------------------------|---------|------|-------|
| A | 2.10 | - | 2.50 |
| A2 | 0 | - | 0.10 |
| B | 0.66 | - | 0.86 |
| B2 | 5.18 | - | 5.48 |
| C | 0.40 | - | 0.60 |
| C2 | 0.44 | - | 0.58 |
| D | 5.90 | - | 6.30 |
| D1 | 5.30REF | | |
| E | 6.40 | - | 6.80 |
| E1 | 4.63 | - | - |
| G | 4.47 | - | 4.67 |
| H | 9.50 | - | 10.70 |
| L | 1.09 | - | 1.21 |
| L2 | 1.35 | - | 1.65 |
| V1 | - | 7° | - |
| V2 | 0° | - | 6° |
| All Dimensions in millimeter | | | |

